



Standard Test Method for Corrosiveness of Lubricating Fluid to Bimetallic Couple¹

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1. Scope

1.1 This test method covers the corrosiveness of hydraulic and lubricating fluids to a bimetallic galvanic couple.

NOTE 1—This test method replicates Fed-Std No. 791, Method 5322.2. It utilizes the same apparatus, test conditions, and evaluation criteria, but it describes test procedures more explicitly.

1.2 The values stated in SI units are to be regarded as the standard. The values in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

A 322 Specification for Steel Bars, Alloy, Standard Grades

2.2 Federal Standards:

Fed-Std No. 791, Method 5322.2 Corrosiveness of Oil on a Bimetallic Couple³

3. Summary of Test Method

3.1 This test method consists of fitting a brass clip to the fluid-coated surface of a steel disk, storing the assembly at approximately 50 % relative humidity for ten days, and visually inspecting the assembly for evidence of galvanic corrosion.

4. Significance and Use

4.1 Corrosiveness of a fluid to a bimetallic couple is one of the properties used to evaluate hydraulic or lubricating fluids. It is an indicator of the compatibility of a fluid with a brass on steel galvanic couple at ambient temperature and 50 % relative humidity.

5. Apparatus

5.1 *Desiccating Jars*, two.

5.2 *Magnifier*, 10 x power.

5.3 *Glass Stirring Rod*.

5.4 *Abrasive Papers*, silicon-carbide or aluminum oxide (150, 240, 400, 600 grit, one sheet per disk).

5.5 *Cloth*, lint-free, clean, dry.

5.6 *Chromium Alloy Steel Disks*, three for each test sample.⁴

5.7 *Brass Clips*, three for each test sample.⁴

6. Reagents and Materials

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the Committee on Analytical Reagents of the American Chemical Society where such specifications are available.⁵

6.2 *Etching Solution*, consisting of distilled water, 450 mL; nitric acid, concentrated, 225 mL; sulfuric acid, concentrated, 300 mL; and hydrochloric acid, concentrated, 8 mL.

6.2.1 To avoid hazardous reactions when preparing the etching solution, place the distilled water (450 mL) in a 1.5-L, or larger, glass beaker set in a container of ice and water. Stir with a glass mechanical stirrer or plastic coated magnetic spin bar while slowly adding concentrated sulfuric acid (300 mL). Add more ice to the cooling bath as needed. When acid addition is complete, continue stirring until the solution has cooled to room temperature, and then start slow addition of the concentrated nitric acid (225 mL). Continue stirring after acid addition until the solution has cooled to room temperature, and then add concentrated hydrochloric acid (8 mL). Allow the mixture to equilibrate to room temperature before use. (**Warning**—Nitric, hydrochloric, and sulfuric acids are very corrosive. Nitric acid and sulfuric acid are also oxidizing acids. The analyst should prepare the etching solution in a well-ventilated hood and wear appropriate gloves, apron, and face shield.)

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.N0.02 on Industrial Applications.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from Standardization Documents Order Desk, Building 4 Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5904, Attn: NPODS.

⁴ Available from Metaspec, 790 W. Mayfield Rd., San Antonio, TX 78211.

⁵ *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.